AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) Process to determine locally the shape of geological horizons, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic traces of a three-dimensional seismic matrix, said $S_{ij,k}(t)$'s function being designated as a "continuous local seismic trace", comprising the following steps:

a). using as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximal their correlation function, with optimal offset not being necessarily a whole multiple of the vertical sampling interval;

b). taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). defining for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood, a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients;

d). determining the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$ by minimization of a set of residuals on the conditional neighborhood; and

e) displaying geological horizons determined based on the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$.

2. (previously presented) Process according to claim 1, in which the residual values of step c) are absolute values of parametric differential having the form $|a_{ij,k}(p-i) + b_{ij,k}(q-j) - h_{ij,kpq,k}|$,

in which $a_{ij,k}$ and $b_{ij,k}$ are parameters and $h_{ij,pq,k}$ is the optimum offset maintained between the "central" continuous local seismic trace $S_{ij,k}(t)$ and an adjacent continuous local seismic trace $S_{pq,k}(t)$.

3. (previously presented) Process according to **claim 1**, in which the minimization of the assembly of residuals $\rho_{ij,pq,k}$ on the conditional neighborhood comprises a minimization of a sum of powers of the residuals, of the form

$$C^{\alpha}(i,j,k) = \sum_{p,q} (\rho_{ij,pq,k})^{\alpha}$$

, in which α is a power greater than 1.

4. (previously presented) Process according to claim 1, in which the coefficients $a_{ij,k}$ and $b_{ij,k}$ determined in step b) are used to define a unitary vector N(i,j,k) of coordinates $N^x(i,j,k)$, $N^y(i,j,k)$, $N^t(i,j,k)$, having the form:

$$N^x(i,j,k) = \frac{a_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^y(i,j,k) = \frac{b_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^t(i,j,k) = \frac{1}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

and in which there is selected this unitary vector as normal unitary vector (orthogonal) to the horizon of the node (i, j, k).

5. (original) Process according to claim 4, in which there is used the set of normal unitary vectors N(i, j, k) to define the field of the normal unitary vectors, for the display on a screen of the seismic horizon profiles.

6. (previously presented) Process according to **claim 1**, in which there is selected as the index of curvature an increase in function of the residuals comprising the parametric coefficients determined in step d).

7. (currently amended) A device for determining locally the shape of geological horizons, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic traces of a three-dimensional seismic matrix, said $S_{ij,k}(t)$'s function being designated as a "continuous local seismic trace", comprising:

means to use as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximum their correlation function,

means to take as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets associated with correlations $R_{ij,pq,k}(h)$ greater than a predetermined threshold comprised between 0 and 1,

means to define for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients, ~~and~~

means to determine the parametric coefficients by minimization of the set of residuals on the conditional neighborhood, and

means to display geological horizons determined based on the parametric coefficients.

8. (currently amended) Device according to claim 7, further comprising memorization means and visualization means of seismic parameters determined using ~~the~~ a process to determine locally the shape of geological horizons.

9. (currently amended) A computer-readable medium encoded with a computer software package to determine locally the shape of geological horizons, comprising program code elements to carry out the steps of:

a). using as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximal their correlation function, with optimal offset not being necessarily a whole multiple of the vertical sampling interval;

b). taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). defining for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood, a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients;

d). determining the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$ by minimization of a set of residuals on the conditional

neighborhood,[[,]] when said program is executed by a computer; and

e) displaying geological horizons determined based on the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$.

10. (currently amended) [[A]] The computer-readable medium encoded with a computer software package as claimed in claim 9, comprising elements of program code to carry out the steps of taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1, in which there is selected as the index of curvature an increase in function of the residuals comprising the parametric coefficients determined in step d), when said program is executed by a computer.

11. (previously presented) Process according to **claim 2**, in which the minimization of the assembly of residuals $\rho_{ij,pq,k}$ on the conditional neighborhood comprises a minimization of a sum of powers of the residuals, of the form

$$C^{\alpha}(i,j,k) = \sum_{p,q} (\rho_{ij,pq,k})^{\alpha}$$

, in which α us a power greater than 1.

12. (previously presented) Process according to **claim 2**, in which there is selected as the index of curvature an increase in function of the residuals comprising the parametric coefficients determined in step d).

13. (previously presented) Process according to **claim 3**, in which there is selected as the index of curvature an increase in function of the residuals comprising the parametric coefficients determined in step d).

14. (currently amended) A device for determining locally the shape of geological horizons, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic traces of a three-dimensional seismic matrix, said $S_{ij,k}(t)$'s function being designated as a "continuous local seismic trace", comprising:

means to use as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximum their correlation function,

means to take as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-

neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets associated with correlations $R_{ij,pq,k}(h)$ greater than a predetermined threshold comprised between 0 and 1,

means to define for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients, [[and]]

means to determine the parametric coefficients by minimization of the set of residuals on the conditional neighborhood, and

means to display geological horizons determined based on the parametric coefficients,

wherein the absolute values of parametric differential having the form $|a_{ij,k}(p-i) + b_{ij,k}(q-j) - h_{ij,kpq,k}|$, in which $a_{ij,k}$ and $b_{ij,k}$ are parameters and $h_{ij,pq,k}$ is the optimum offset maintained between the "central" continuous local seismic trace $S_{ij,k}(t)$ and an adjacent continuous local seismic trace $S_{pq,k}(t)$.

15. (currently amended) Device for determining locally the shape of geological horizons, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic traces of a three-dimensional seismic matrix, said $S_{ij,k}(t)$'s function being designated as a "continuous local seismic trace", comprising:

means to use as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximum their correlation function,

means to take as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets associated with correlations $R_{ij,pq,k}(h)$ greater than a predetermined threshold comprised between 0 and 1,

means to define for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients, [[and]]

means to determine the parametric coefficients by minimization of the set of residuals on the conditional neighborhood, and

means to display geological horizons determined based on the parametric coefficients,

wherein the minimization of the assembly of residuals $\rho_{ij,pq,k}$ on the conditional neighborhood comprises a minimization of a sum of powers of the residuals, of the form

$$C^{\alpha}(i,j,k) = \sum_{p,q} (\rho_{ij,pq,k})^{\alpha}$$

, in which α is a power greater than 1.

16. (currently amended) A device for determining locally the shape of geological horizons, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic traces of a three-dimensional seismic matrix, said $S_{ij,k}(t)$'s function being designated as a "continuous local seismic trace", comprising:

means to use as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximum their correlation function,

means to take as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets associated with correlations $R_{ij,pq,k}(h)$ greater than a predetermined threshold comprised between 0 and 1,

means to define for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients, [[and]]

means to determine the parametric coefficients by minimization of the set of residuals on the conditional neighborhood, and

means to display geological horizons determined based on the parametric coefficients,

in which the coefficients $a_{ij,k}$ and $b_{ij,k}$ determined in step b) are used to define a unitary vector N(i,j,k) of

coordinates $N^x(i,j,k)$, $N^y(i,j,k)$, $N^t(i,j,k)$, for example of the form:

$$N^x(i,j,k) = \frac{a_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^y(i,j,k) = \frac{b_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^t(i,j,k) = \frac{1}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 - 1}}$$

and in which there is selected this unitary vector as normal unitary vector (orthogonal) to the horizon of the node (i, j, k).

17. (currently amended) A computer-readable medium encoded with a computer software package to determine locally the shape of geological horizons, comprising program code elements to carry out the steps of:

a). using as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximal their correlation function, with optimal offset not being necessarily a whole multiple of the vertical sampling interval;

b). taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum

offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). defining for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood, a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients;

d). determining the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$ by minimization of a set of residuals on the conditional neighborhood, [[,]] when said program is executed by a computer, and

e) displaying geological horizons determined based on the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$,

wherein the residual values of step c) are absolute values of parametric differential having the form $|a_{ij,k}(p-i) + b_{ij,k}(q-j) - h_{ij,kpq,k}|$,

in which $a_{ij,k}$ and $b_{ij,k}$ are parameters and $h_{ij,pq,k}$ is the optimum offset maintained between the "central" continuous local seismic trace $S_{ij,k}(t)$ and an adjacent continuous local seismic trace $S_{pq,k}(t)$.

18. (currently amended) A computer-readable medium encoded with a computer software package to determine locally the shape of geological horizons, comprising program code elements to carry out the steps of:

a). using as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximal their correlation function, with optimal offset not being necessarily a whole multiple of the vertical sampling interval;

b). taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). defining for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood, a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients;

d). determining the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$ by minimization of a set of residuals on the conditional neighborhood, [[,]] when said program is executed by a computer, and

e) displaying geological horizons determined based on the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$,

wherein the minimization of the assembly of residuals $\rho_{ij,pq,k}$ on the conditional neighborhood comprises a minimization of a sum of powers of the residuals, of the form

$$C^{\alpha}(i,j,k) = \sum_{p,q} (\rho_{ij,pq,k})^{\alpha}$$

, in which α is a power greater than 1.

19. (currently amended) A computer-readable medium encoded with a computer software package to determine locally the shape of geological horizons, comprising program code elements to carry out the steps of:

a). using as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximal their correlation function, with optimal offset not being necessarily a whole multiple of the vertical sampling interval;

b). taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). defining for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood, a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients;

d). determining the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$ by minimization of a set of residuals on the conditional neighborhood, [[,]] when said program is executed by a computer, and

e) displaying geological horizons determined based on the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$,

wherein the coefficients $a_{ij,k}$ and $b_{ij,k}$ determined in step b) are used to define a unitary vector N(i,j,k) of coordinates $N^x(i,j,k)$, $N^y(i,j,k)$, $N^t(i,j,k)$, for example of the form:

$$N^x(i,j,k) = \frac{a_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^y(i,j,k) = \frac{b_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^t(i,j,k) = \frac{1}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 - 1}}$$

and in which there is selected this unitary vector as normal unitary vector (orthogonal) to the horizon of the node (i, j, k).

20. (currently amended) A computer-readable medium encoded with a computer software package to determine locally the shape of geological horizons, comprising program code elements to carry out the steps of:

a). using as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximal their correlation function, with optimal offset not being necessarily a whole multiple of the vertical sampling interval;

b). taking as conditional neighborhood of a "central" continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c). defining for each continuous local seismic trace $S_{pq,k}(t)$ of the conditional neighborhood, a value of residual relative to said "central" continuous local seismic trace $S_{ij,k}(t)$ comprising parametric coefficients;

d). determining the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$ by minimization of a set of residuals on the conditional neighborhood, [[,]] when said program is executed by a computer, and

e) displaying geological horizons determined based on the parametric coefficients $a_{ij,k}$ and $b_{ij,k}$,

wherein the coefficients $a_{ij,k}$ and $b_{ij,k}$ determined in step b) are used to define a unitary vector N(i,j,k) of coordinates $N^x(i,j,k)$, $N^y(i,j,k)$, $N^t(i,j,k)$, for example of the form:

$$N^x(i,j,k) = \frac{a_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^y(i,j,k) = \frac{b_{ij,k}}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 + 1}}$$

$$N^t(i,j,k) = \frac{1}{\sqrt{(a_{ij,k})^2 + (b_{ij,k})^2 - 1}}$$

and in which there is selected this unitary vector as normal unitary vector (orthogonal) to the horizon of the node (i, j, k); and

wherein there is used the set of normal unitary vectors N(i, j, k) to define the field of the normal unitary vectors, for the display on a screen of the seismic horizon profiles.